

Minutes of NPBRT Meeting: 1-19-16
USFS Conf. Room (3-5 PM) 100 Main Street, Walden, CO

Members/Liaisons Present

*Mike Allnutt
*Jimmer Baller
*Kent Crowder
Debbi Heeney
*John Rich
*Carl Trick II
*Barbara Vasquez
*Doug Waldron
*Ty Wattenberg
Jeremiah Zamora

Members/Liaisons Absent

Paula Belcher
Pete Conovitz
Mike Dixon
*Blaine Evans
*Mike Honholz
Russ Gross
*Randy Miller
*Rick Wyatt

Others Present

Dan Henrichs
Pepper Canterbury-CPW
Joe Busto-CWCB
Herb Winston-Vaisala
Jason Niven-Sandridge Energy
Brian Austin-Erick Flowback

I. Agenda Review

Agenda was accepted as proposed.

II. Approval of Roundtable Minutes: 11-24-15

The minutes of the 11-24-15 were accepted as published.

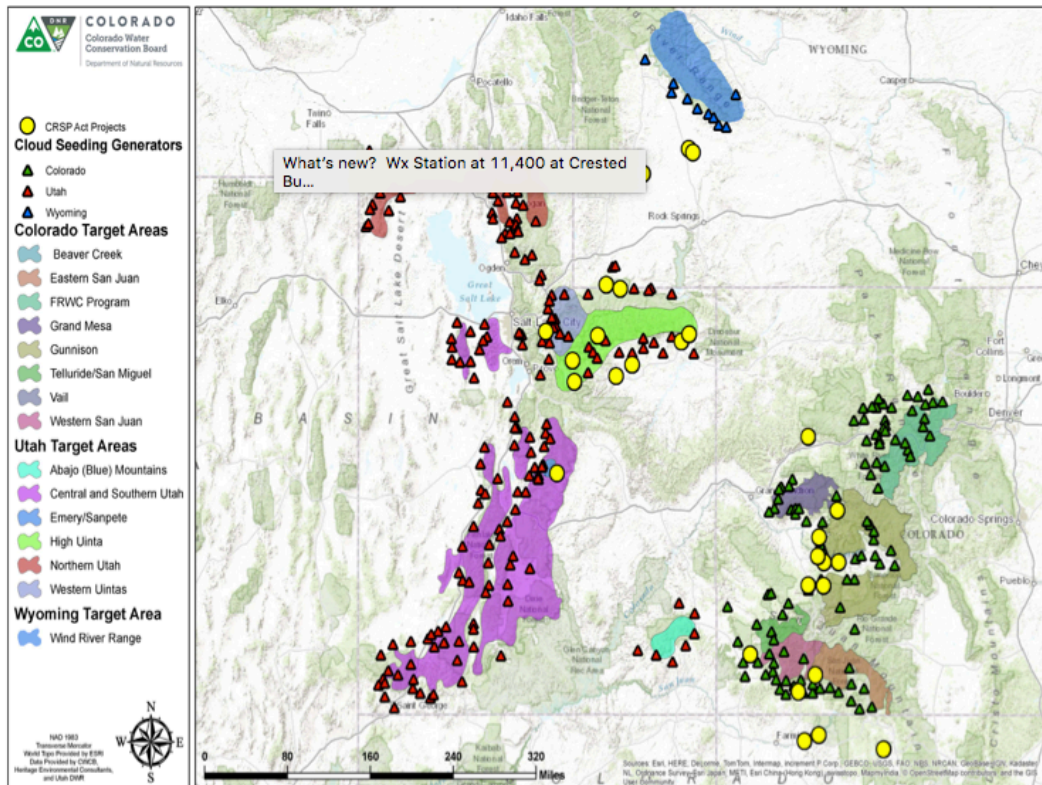
III. Presentation on Colorado Weather Modification and Radar Monitoring Stations – Joe Busto, Weather Modification and South Platte River Program Coordinator, Colorado Water Conservation Board, Watershed and Flood Protection Section

Joe presented a very detailed picture of weather modification (cloud seeding) and the weather radar capabilities just emerging to monitor snow accumulation. His presentation is attached with these minutes. I will attempt to summarize the key points but encourage you to take a look at his material.

- Joe's responsibilities include issuing permits for Colorado weather modification, regulating that weather modification and using grant money to run experiments to demonstrate and improve weather modification efficacy. \$484k budget.
- Colorado has 107 generators in 7 target areas. Many were funded by partnering water districts with ski areas.
- BRT funds used for Grand Mesa and Crested Buttes
- 2 types of ground-based cloud seeders; choice depends on temperature.
- Silver Iodide burners for temperatures of -6 deg or lower. Position is critical for effectiveness: approx. 2/3 the way up the slope, longer range effect. Inject silver into clouds to seed snow in the precipitation shadow.
- Alkalai propane burners for higher temperatures. Similar need for position to get the lift into clouds, but shorter range effect (2-3 miles from burner).
- Many burners in Colorado are located in basins where they will have little positive impact, because the 'seeds' never make it to the clouds (winter inversions).
- Studies have shown the snow effected by silver cloud seeding has a vanishingly low level of silver, in the parts per trillion range.
- New equipment installed @8800 ft near Telluride Dec 2015 in partnership between

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- local and state water districts plus Telluride Ski & Golf Company
- Lots of cloud seeding RD conducted on Grand Mesa; largest flat-topped mesa in the world.
- Two new generators at Winter Park; anecdotal evidence of impact plus measured silver in snow.
- Ted Kowalski: Posing the question whether WY wants to participate with CO to seed the N Platte to benefit flow in the Platte River.
- Critical to have good temperature, wind direction and cloud/water vapor data to use cloud seeding effectively. Radiometer used to detect water vapor in clouds before raindrops form. Radar detects larger particles like rain drops and snow. These data allow selective deployment of cloud seeding from a given location. Many mountainous basins (including the North Platte) don't have good (or any) ground-based radar data.
- Radar beam blockage in the mountains increases gaps in coverage.
- Colorado field campaign(2014-2015) using mobile dual pole ground radar equipment provided by Ken Howard, NOAA-NSSL, Norman, Oklahoma. (Price of unit: \$545k.)
- A case was made for the value of gap-filling ground-based radar based on the Sept. 29, 2014 severe weather event in SW Colorado.
- New use of two dimensional radar to measure snow fall. It provides data not covered by Sno-Tel.
- Oct. 2015 CWCB report: Inventory and Assessment of Colorado Weather Modification Programs. This report will be sent out by separate email due to size.
- Presentation Jan. 27 to CWCB: "Upper Rio Grande Basin snowfall measurement and stream flow forecasting improvement project"
- Map of current generator locations in CO, UT, WY.



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There were a number of questions for Joe during his presentation and some are summarized here. Carl T. asked how much advance warning does this ground-based radar give for a big snow event. Joe answered: not sure for snow but for rain events it's about 45-60 minutes. Barbara asked about the potential decline in precipitation downwind of the seeding event, essentially 'robbing Peter to pay Paul'. Joe said this question has come up a lot and there really isn't enough good data to answer with any certainty. Carl T. also asked: what's the value proposition? Joe responded with Winter Park experience: \$20k of silver iodide added somewhere between 2 and 20ft of snow. The Wyoming Study shows an efficient average of 3% gain, with gains between 5-15% possible. Barbara asked if we implemented cloud seeding for the North Platte, what would that look like? Joe responded that you'd want seeders on the W side of the basin (in Routt County) about 2/3 up the height of the Park Range as well as some on the Medicine Bow (E) side of the basin. When asked what one burner might produce in additional snowfall, his estimate was approximately 1%, but the benefit would likely be shared on both sides of the ridgeline. A partnership between the Yampa-White basin, the NP basin, Wyoming and Ft Collins might provide funding for a project that could benefit all the participants. Carl asked about permitting on federal lands. Is there a Forest Service policy? Joe responded there are lots of permits for existing burners on FS lands and they were permitted under a generic NEPA.

Following Joe's presentation, Herb Winston of Vaisala Inc gave a brief presentation on the radar equipment and software they manufacture and sell. About 12 years ago they started manufacturing mobile dual polarization X-band weather radar equipment. His presentation will be sent by separate email. He also provided some handouts to Barbara and the links to two of those materials are provided below:

Vaisala weather radars: Optimized dual-polarization performance

[http://www.vaisala.com/Vaisala Documents/Brochures and Datasheets/WEA-MET-Weather Radar Brochure B210696EN-F-lores-pages.pdf](http://www.vaisala.com/Vaisala_Documents/Brochures_and_Datasheets/WEA-MET-Weather_Radar_Brochure_B210696EN-F-lores-pages.pdf)

Vaisala IRIS Focus: Weather radar software

[http://www.vaisala.com/Vaisala Documents/Brochures and Datasheets/141216_vaisala_iris_vision_brochure-final-lores-pages.pdf](http://www.vaisala.com/Vaisala_Documents/Brochures_and_Datasheets/141216_vaisala_iris_vision_brochure-final-lores-pages.pdf)

IV. North Platte Basin Roundtable Education Committee Report-Deb Alpe

Deb Alpe was not present but provided a report, which was distributed at the end of the meeting, and is copied below. There wasn't sufficient time remaining in the meeting to discuss the report.

NPBRT Ed Committee met at 2 p.m. 11-24-15 to prioritize educational activities for FY 2016. We are approved to spend up to \$6500 from CWCB to implement EAP. As noted in minutes from the NPBRT Meeting 11-24-15, Deb reported to the board that the Education Committee would like to proceed with working with Christi Bode of Moxiecran Media LLC to create a North Platte Basin video.

Christi Bode is invited to come to Walden February 23 to meet with the Education Committee to further discuss the video project and to possibly discuss the project during the Roundtable meeting if the board wants to include her on the agenda. QUESTION—Does the board want to meet with Christi?

Deb consulted with Kate McIntire from CWCB to discuss if it was permissible for the Roundtable to obligate FY 2016 EAP funds to cover the cost of the video production and then proceed to complete the project during the course of the next year to allow for capturing all seasons of the water year. After first indicating we could probably work this out

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using a Purchase Order, Kate later informed that we are not allowed to do this because the state cannot pay in advance for work that is not completed. If we want to start the project right away in order to have the time needed to capture all aspect of our water year, we will need to pay for it using funds for both FY 2016 and FY 2017.

Curran Trick, attorney with Lawrence Jones Custer Grasmick LLP firm in Johnstown, CO followed up with Deb after the Education meeting and further expressed interest in developing a Colorado Water Law presentation customized for the North Platte Basin. She is thinking that February or March 2017 is the best time line for her to consider. The Education Committee will work with Curran as she develops that program.

Deb will schedule an Education Committee meeting on Feb 23 at 1:30 prior to the NPBRT Meeting at 3 pm.

V. Date for the next meeting

The next meeting was set for Tuesday, Feb. 23 to be held from 3-5 p.m. in the USFS Conference Room at 100 Main Street, Walden.